CLAIMS

What is claimed is:

1. A method, comprising:

representing a charge pump output signal as a superposition of current steps that step in opposite directions at different times.

2. The method of claim 1 further comprising determining a filter output voltage that results from said charge pump output signal by adding current step responses to each of said current steps.

3. The method of claim 1 wherein a first of said current steps occurs when a reference clock edge rises.

4. The method of claim 3 wherein said first current step is in a positive direction.

5. The method of claim 1 wherein a second of said current steps occurs when voltage controlled oscillator output clock edge rises.

6. The method of claim 5 wherein said second current step is in a negative direction.

7. A method, comprising:

a) calculating a filter output voltage by adding a pair of current step responses to a summation of prior pairs of current step responses;

b) calculating an instant of time when an integration of said filter output voltage will reach a reference voltage;

c) triggering a voltage controlled oscillator output clock edge at said instant of time; and

d) stepping a pair of current steps at a temporal offset with respect to one another, said temporal offset equal to a difference between a rising voltage controlled oscillator output clock edge instant of time and a rising reference clock edge instant of time.

8. The method of claim 7 wherein said stepping a pair of current steps further comprises stepping a first current step at said rising reference clock edge instant of time.

9. The method of claim 8 wherein said first current step is positive.

10. The method of claim 8 wherein said stepping a pair of current steps further comprises stepping a second current step at said rising voltage controlled oscillator output clock edge instant of time.

11. The method of claim 10 wherein said second current step is negative.

12. The method of claim 7 further comprising setting said integration of said filter voltage to zero after said reference voltage is reached.

13. The method of claim 7 wherein said calculating corresponds to a recalculation of when said filter voltage will reach said reference voltage, said

pair of current step responses produced by a lagging rising voltage controlled oscillator output clock edge.

14. A machine readable medium having stored thereon sequences of instructions which are executable by a digital processing system, and which, when executed by the digital processing system, cause the system to perform a method comprising, comprising:

representing a charge pump output signal as a superposition of current steps that step in opposite directions at different times.

15. The machine readable medium of claim 14 wherein said method further comprises determining a filter output voltage that results from said charge pump output signal by adding current step responses to each of said current steps.

16. The machine readable medium of claim 14 wherein a first of said current steps occurs when a reference clock edge rises.

17. The machine readable medium of claim 16 wherein said first current step is in a positive direction.

18. The machine readable medium of claim 14 wherein a second of said current steps occurs when voltage controlled oscillator output clock edge rises.

19. The machine readable medium of claim 18 wherein said second current step is in a negative direction.

20. A machine readable medium having stored thereon sequences of instructions which are executable by a digital processing system, and which, when executed by the digital processing system, cause the system to perform a method comprising:

a) calculating a filter output voltage by adding a pair of current step responses to a summation of prior pairs of current step responses;

b) calculating an instant of time when an integration of said filter output voltage will reach a reference voltage;

c) triggering a voltage controlled oscillator output clock edge at said instant of time; and

d) stepping a pair of current steps at a temporal offset with respect to one another, said temporal offset equal to a difference between a rising voltage controlled oscillator output clock edge instant of time and a rising reference clock edge instant of time.

21. The machine readable medium of claim 20 wherein said stepping a pair of current steps further comprises stepping a first current step at said rising reference clock edge instant of time.

22. The machine readable medium of claim 21 wherein said first current step is positive.

23. The machine readable medium of claim 21 wherein said stepping a pair of current steps further comprises stepping a second current step at said rising voltage controlled oscillator output clock edge instant of time.

24. The machine readable medium of claim 23 wherein said second current step is negative.

25. The machine readable medium of claim 20 wherein said method further comprises setting said integration of said filter voltage to zero after said reference voltage is reached.

26. The machine readable medium of claim 20 wherein said calculating corresponds to a recalculation of when said filter voltage will reach said reference voltage, said pair of current step responses produced by a lagging rising voltage controlled oscillator output clock edge.